

WHAT IS CLAIMED IS:

1. An endoscope capable of being autoclaved,  
comprising:

an insertion unit having a soft member made of a soft  
polymeric material as at least part of a casing thereof:

an internal endoscope space including the internal  
space of said insertion unit that is sealed at a first  
sealing level at which the internal space is sealed in a  
watertight manner relative to an outside; and

contents all or part of which are stowed in said  
internal endoscope space, and which include at least one  
hermetically sealed unit composed of a plurality of airtight  
partition members and formed at a second sealing level  
higher than the first sealing level by joining the meeting  
portions of said airtight partition members using an  
airtight joining means;

wherein even when high-pressure high-temperature steam  
permeates through said soft member of said insertion unit  
which is made of a polymeric material, and invades into said  
internal endoscope space formed at the first sealing level,  
the high-pressure high-temperature steam will be hindered  
from invading into the hermetically sealed unit included in  
said contents and formed at the second sealing level.

92

2. An endoscope capable of being autoclaved according to claim ~~1~~<sup>231</sup>, wherein said airtight partition members are members made of a metal, ceramic, glass, or crystalline material.

Sub 921  
3. An endoscope capable of being autoclaved according to claim ~~1~~<sup>231</sup>, wherein the components of the joints at which said airtight partition members are hermetically joined using said airtight joining means are a metal, ceramic, glass, or crystalline material.

4. An endoscope capable of being autoclaved according to claim 3, wherein said airtight joining means is a joining method based on welding such as fusion welding, pressure welding, brazing, soldering or a joining method using a molten glass.

5. An endoscope capable of being autoclaved according to claim 1, wherein said hermetically sealed unit included in said contents and formed at the second sealing level is pressure-resistant to resist a negative pressure or pressurization to be attained or performed during autoclaving so as not to be destroyed, and wherein said hermetically sealed unit is sealed to such an extent that high-pressure high-temperature steam given off during

93

autoclaving will not invade into the interior thereof.

6. An endoscope capable of being autoclaved according to claim 1, wherein said hermetically sealed unit includes at least one of optical members and electronic parts or both the optical members and electronic parts as internal members or airtight partition members.

7. An endoscope capable of being autoclaved according to claim 6, wherein said hermetically sealed unit is a lens unit having optical members, which are airtight partition members, hermetically locked as optical windows in both end portions thereof.

8. An endoscope capable of being autoclaved according to claim 6, wherein said contents include an observing means having an optical member, which is an airtight partition member, as an optical window hermetically locked therein, and said optical window is bared on the outer surface of said endoscope as part of the housing thereof.

9. An endoscope capable of being autoclaved according to claim 7, wherein said observing means is an imaging unit having a solid-state imaging device as part of an image transmitting means, and an objective unit having optical

addart  
cont.

65939 "65939" 65939

Sub 221  
Cont.

windows hermetically locked in both end portions thereof is located at the image input end of said solid-state imaging device.

10. An endoscope capable of being autoclaved according to claim 8, wherein a metal coating having a low reflectance layer as a lowermost layer and a joining layer as an uppermost layer is formed on the outer circumferences of said optical windows included in said lens unit, or in other words, at joints at which said optical windows meet another member.

9  
11. An endoscope capable of being autoclaved according to claim <sup>8</sup>10, wherein said low reflectance layer has a two-layer structure <sup>consisting</sup> or consists of a lower layer made of chromium oxide and an upper layer made of chromium.

for  
12/12

10  
12. An endoscope capable of being autoclaved according to claim <sup>8</sup>10, wherein <sup>said</sup> the outer circumferences of said <sup>members</sup> optical windows on which said low reflectance layer is formed are polished so that an average roughness (Ra) will fall within <sup>a</sup> the range of 0.1  $\mu\text{m}$  to 1  $\mu\text{m}$  and <sup>a</sup> the largest <sup>roughness</sup> height (Pv) will fall within <sup>a</sup> the range of 2  $\mu\text{m}$  to 5  $\mu\text{m}$ .

10  
13. An endoscope capable of being autoclaved according

94

to claim <sup>5</sup> ~~9~~, wherein one of said optical windows included in  
 a said objective unit is placed in ~~close~~ contact with <sup>a</sup> ~~the~~  
 image input end of said solid-state imaging device.

17  
14. An endoscope capable of being autoclaved according to claim 13, wherein said optical window and said image input end of said solid-state imaging device are closely joined using a transparent adhesive.

15. ~~An endoscope capable of being autoclaved according to claim 9, wherein said contents include an objective unit for forming an object image and an imaging unit having a solid-state imaging device on which the formed object image is projected, wherein said objective unit accommodating said hermetically sealed unit formed at the second sealing level is located in front of the imaging surface of said solid-state imaging device, and wherein a member opposed to the proximal outer surface of said solid-state imaging device is sealed at the first sealing level.~~

16. An endoscope capable of being autoclaved according to claim 8, wherein when a bendable part capable of being bent is located near the distal end of said insertion unit, said hermetically sealed unit included in said contents is positioned within a distal rigid part distal to said

95

bendable part.

11  
17. An endoscope capable of being autoclaved according to claim 7, wherein said contents include an observing means or illuminating means having an optical fiber bundle as a light introducing path, and said lens unit is located at the input end or output end of said optical fiber bundle.

12  
18. An endoscope capable of being autoclaved according to claim 17, wherein one of said optical windows included in said lens unit is placed in close contact with the input end or output end of said optical fiber bundle.

13  
19. An endoscope capable of being autoclaved according to claim 17, wherein said lens unit located at the end of said optical fiber bundle can be attached or detached freely.

20. An endoscope capable of being autoclaved according to claim 6, wherein said contents include an observing means or illuminating means having an optical fiber bundle as a light introducing path, optical fibers constituting the input end portion or output end portion of said optical fiber bundle are infiltrated with an airtightness retaining filler in order to make the optical fibers airtight, and wherein the end portions of said optical fiber bundle are

hermetically fixed to airtight partition members that are integral parts of said hermetically sealed unit.

Sub B 1  
21. An endoscope capable of being autoclaved according to claim 6, wherein said hermetically sealed unit has an optical member, which is engaged with a frame member, as an internal member or airtight partition member, and wherein when another optical members are closely united with the optical path surface of the optical member, the another optical members are not engaged with said frame member.

22. An endoscope capable of being autoclaved according to claim 1, wherein a bendable part capable of being bent is located near the distal end of said insertion unit, a first hermetically sealed unit is included in a distal rigid part distal to the distal end of said bendable part, a second hermetically sealed unit is located near said operation unit beyond said bendable part, and said first and second hermetically sealed units are electrically linked by a cable.

add  
920